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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,341	02/08/2002	J. Yong Ryu	CDT 1694	2354

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EXAMINER

GRIFFIN, WALTER DEAN

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 03/06/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/071,341

Applicant(s)

RYU ET AL.

Examiner

Walter D. Griffin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- ☐ Interview Summary (PTO-413) Paper No(s) _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other:

DETAILED ACTION

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because it does not identify the city and either state or foreign country of residence of each inventor. The residence information may be provided on either on an application data sheet or supplemental oath or declaration.

The city and state of residence of J. Yong Ryu is missing.

The oath or declaration is defective because it does not identify the mailing or post office address of each inventor. A mailing or post office address is an address at which an inventor customarily receives his or her mail and may be either a home or business address. The mailing or post office address should include the ZIP Code designation. The mailing or post office address may be provided in an application data sheet or a supplemental oath or declaration. See 37 CFR 1.63(c) and 37 CFR 1.76.

The post office address for Fritz Dautzenberg is incomplete. No city is listed.

Claim Objections

Claims 1, 7, and 8 are objected to because of the following informalities: In claim 1, the word "feed" in step (c) should apparently be "feeding". In step (e) of claims 7 and 8, the word "product" should apparently be "produce". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 is indefinite because it incorrectly refers to contacting normal alkene with hydrogen to selectively hydrogenate dienes. There is no prior indication that the expression "normal alkene" refers to a stream that contains dienes. It appears as if the claim should refer to the selective hydrogenation of the effluent from the dehydrogenation zone and not just the selective hydrogenation of normal alkene.

Claim 7 is indefinite because it incorrectly refers to the selective hydrogenation of normal butenes to hydrogenate dienes in step (d). There is no prior indication that the expression "normal butenes" refers to a stream that contains dienes. It appears as if the claim should refer to the selective hydrogenation of the effluent from the dehydrogenation zone and not just the selective hydrogenation of normal butene.

Claim 8 is indefinite because it incorrectly refers to the selective hydrogenation of normal pentenes to hydrogenate dienes in step (d). There is no prior indication that the expression "normal pentenes" refers to a stream that contains dienes. It appears as if the claim should refer to the selective hydrogenation of the effluent from the dehydrogenation zone and not just the selective hydrogenation of normal pentene.

Claim 8 is also indefinite because the expression "skeletal isomerization" in step (b) is incorrect. It appears as if step (b) should read as follows: "isomerizing a portion of the separated normal pentane to isopentanes;".

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Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4, and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Allender (US 2,314,435).

The Allender reference discloses a process for upgrading a C₄ hydrocarbon stream. The process comprises introducing the hydrocarbon stream that contains isobutane and normal butane into a separation zone such as a fractional distillation column to separate the isobutane from the normal butane. A portion of the normal butane is then passed to a dehydrogenation unit in which normal butene is produced. Another portion of the normal butane is passed to an isomerization unit in which isobutane is produced. The isobutane recovered from the separation zone is passed along with the normal butene produced in the dehydrogenation zone to an alkylation zone to form an alkylate. This alkylate would necessarily contain a branched alkane. See page 2, left column, line 69 through page 3, left column, line 62.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allender et al. (US 2,314,435) in view of Vora (US 4,520,214).

The Allender reference discloses a process for upgrading a C₄ hydrocarbon stream. The process comprises introducing the hydrocarbon stream that contains isobutane and normal butane into a separation zone such as a fractional distillation column separate the isobutane from the normal butane. A portion of the normal butane is then passed to a dehydrogenation unit in which normal butene is produced. Another portion of the normal butane is passed to an isomerization unit in which isobutane is produced. The isobutane recovered from the separation zone is passed along with the normal butene produced in the dehydrogenation zone to an alkylation zone to form an alkylate. This alkylate would necessarily contain a branched alkane such as isooctane. See page 2, left column, line 69 through page 3, left column, line 62.

The Allender reference does not disclose the selective hydrogenation of dienes in the dehydrogenation zone effluent and does not disclose utilizing a C₅ stream as in claim 8.

The Vora reference discloses the selective hydrogenation of dienes contained in a dehydrogenation zone effluent stream. See column 1, lines 7-19; column 2, line 37 through column 3, line 20; and column 4, lines 41-53.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Allender process by selectively hydrogenating dienes in the dehydrogenation zone effluent as suggested by Vora because dienes that react downstream to produce undesired products will be removed thereby limiting the production of undesired products.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Allender by utilizing a C₅ stream instead of the disclosed C₄ stream because a C₅ stream would be expected to be similarly converted to useful products in the process of Allender since a C₅ stream is chemically and physically similar to the disclosed C₄ stream.

Conclusion

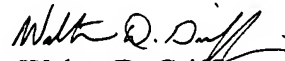
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter D. Griffin whose telephone number is 703-305-3774. The examiner can normally be reached on Monday-Friday 6:30 to 4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the

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organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.



Walter D. Griffin
Primary Examiner
Art Unit 1764

WG
March 4, 2003